Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in this application.

Listing of Claims:

Claims 67-75 (Canceled).

Claim 76 (Previously Presented): In a method of x-ray imaging using an intensifying screen to receive x-rays and emit light to be recorded on an x-ray film, a method of calculating from the film image density the energy which was imparted to the intensifying screen, comprising the steps of:

calibrating the film and intensifying screen by measuring the response of the film and intensifying screen to a plurality of different intensities of received x-rays;

fitting a theoretical model of the expected response to the measured response, and using the fitted theoretical model to calculate the imparted energy from the image density.

Claim 77 (Previously Presented): A method according to claim 76, wherein the theoretical model is a serpentine curve of the form:

$$x^2 y + a^2 y - b^2 x = 0,$$

where a and b are constants, x is the logarithm of the energy imparted to the intensifying screen and y is the image density.

Claim 78 (Previously Presented): A method according to claim 76, wherein the response of the film and intensifying screen to a plurality of different intensities of received x-rays is measured by exposing the film-screen combination to x-rays through a lucite step wedge and measuring the image density produced by the exposure through the different steps of the wedge.

Claim 79 (Previously Presented): Apparatus for calculating from image densities of an x-ray film image the energy which was imparted to an intensifying screen used to receive x-rays and emit light to be recorded on the x-ray film, the apparatus comprising:-

fitting means for fitting a theoretical model of the expected response of the x-ray film and intensifying screen to a plurality of different intensities of received x-rays to a measured response, and

calculation means for using the fitted theoretical model to calculate the imparted energy from the image density.

Claim 80 (Previously Presented): Apparatus according to claim 79, wherein the theoretical model is a serpentine curve of the form:

$$x^2 y + a^2 y - b^2 x = 0,$$

where a and b are constants, x is the logarithm of the energy imparted to the intensifying screen and y is the image density.

Claim 81 (Previously Presented): A computer program storage medium readable by a computer system and encoding a computer program for controlling a computer to calculate from

image densities of an x-ray film the energy which was imparted to an intensifying screen used to receive x-rays and emit light recorded on the x-ray film, by a method comprising the steps of:

fitting a theoretical model of the expected response of the x-ray film and intensifying screen to a plurality of different intensities of received x-rays to a measured response, and using the fitted theoretical model to calculate the imparted energy from the image density.

Claim 82 (Previously Presented): A computer program storage medium according to claim 81, wherein the theoretical model is a serpentine curve of the form:

$$x^2 y + a^2 y - b^2 x = 0,$$

where a and b are constants, x is the logarithm of the energy imparted to the intensifying screen and y is the image density.

Claim 83 (Previously Presented): In a method of x-ray imaging in which an intensifying screen is used to receive x-rays and emit light to be recorded on an x-ray, the image recorded on the film is digitised to give a pixelised digital representation of the image density on the film, a method of enhancing the digital representation of the image to remove the contribution thereto of glare from the intensifying screen comprising the steps of:

converting the digital representation of image density into a representation of the energy imparted to the screen; and

deconvolving the representation of the energy imparted to the screen using a weighting mask defining the point spread function for the intensifying screen to remove the contribution thereto of glare from the intensifying screen.

Claim 84 (Previously Presented): A method according to claim 83, wherein the weighting mask defines the contribution to the energy imparted to the screen caused by the emission of light from the point of absorption of an x-ray towards neighbouring pixels weighted by distance from the absorption site to the pixel.

Claim 85 (Previously Presented): A method according to claim 84, wherein the weighting mask defines the contribution to the energy imparted to the screen caused by the emission of light from the point of absorption of an x-ray towards neighbouring pixels further weighted by the depth of the absorption site in the intensifying screen.

Claim 86 (Previously Presented): A method of detecting film-screen shot noise in a x-ray image in which an intensifying screen is used to receive x-rays and to emit light to be recorded as an image on a x-ray film, the image recorded on the film being digitised to give a pixelised digital representation thereof which is then converted into a representation of the energy imparted to the screen, the method comprising removing from that representation glare from the intensifying screen in accordance with the method of claim 83, and defining as film-screen shot noise regions of the image in which the resultant value for energy imparted to the screen is infeasible.

Claim 87 (Previously Presented): A method according to claim 86, wherein regions of the image in which resultant values for energy imparted to the screen having negative values are defined as film-screen shot noise.

Claim 88 (Previously Presented): A method according to claim 86, wherein the image is a mammogram.

Claim 89 (Previously Presented): Apparatus for enhancing the digital representation of an x-ray image obtained by using an intensifying screen to receive x-rays and emit light to be recorded on an x-ray film and digitising the film to give a pixelised digital representation of the image density thereon the apparatus comprising:

conversion means for converting the digital representation of image density into a representation of the energy imparted to the screen; and

deconvolution means for deconvolving the representation of the energy imparted to the screen using a weighting mask defining the point spread function for the intensifying screen to remove the contribution thereto of glare from the intensifying screen.

Claim 90 (Previously Presented): Apparatus according to claim 89, wherein the weighting mask defines the contribution to the energy imparted to the screen caused by the emission of light from the point of absorption of an x-ray towards neighbouring pixels weighted by distance from the absorption site to the pixel.

Claim 91 (Previously Presented): Apparatus according to claim 90, wherein the weighting mask defines the contribution to the energy imparted to the screen caused by the emission of light from the point of absorption of an x-ray towards neighbouring pixels further weighted by the depth of the absorption site in the intensifying screen.

Claim 92 (Previously Presented): Apparatus for detecting film-screen shot noise in a x-ray image obtained by using an intensifying screen to receive x-rays and to emit light to be recorded as an image on an x-ray film, the image recorded on the film being digitised to give a pixelised digital representation thereof which is then converted into a representation of the energy imparted to the screen, the apparatus comprising apparatus according to claim 89 for removing from that representation glare from the intensifying screen, and means for defining as film-screen shot noise regions of the image in which the resultant value for energy imparted to the screen is infeasible.

Claim 93 (Previously Presented): Apparatus according to claim 92, wherein regions of the image in which resultant values for energy imparted to the screen having negative values are defined as film-screen shot noise.

Claim 94 (Previously Presented): Apparatus according to claim 92, wherein the image is a mammogram.

Claim 95 (Previously Presented): A computer program storage medium readable by a computer system and encoding a computer program for controlling a computer to enhance the digital representation of an x-ray image obtained by using an intensifying screen to receive x-rays and emit light to be recorded on an x-ray film, the image recorded on the film being digitised to give a pixelised digital representation of the image density thereon, the removal from the digital representation of the image of the contribution thereto of glare from the intensifying screen comprising the steps of:

converting the digital representation of image density into a representation of the energy imparted to the screen; and

deconvolving the representation of the energy imparted to the screen using a weighting mask defining the point spread function for the intensifying screen to remove the contribution thereto of glare from the intensifying screen.

Claim 96 (Previously Presented): A computer program storage medium according to claim 95, wherein the weighting mask defines the contribution to the energy imparted to the screen caused by the emission of light from the point of absorption of an x-ray towards neighbouring pixels weighted by distance from the absorption site to the pixel.

Claim 97 (Previously Presented): A computer program storage medium according to claim 96 , wherein the weighting mask defines the contribution to the energy imparted to the screen caused by the emission of light from the point of absorption of an x-ray towards neighbouring pixels further weighted by the depth of the absorption site in the intensifying screen.

Claim 98 (Previously Presented): A computer program storage medium readable by a computer system and encoding a computer program for controlling a computer to detect film-screen shot noise in a x-ray image obtained by using an intensifying screen to receive x-rays and to emit light to be recorded as an image on an x-ray film, the image recorded on the film being digitised to give a pixelised digital representation thereof which is then converted into a representation of the energy imparted to the screen, the detection of film-screen shot noise

comprising removing from that representation glare from the intensifying screen in accordance with claim 95, and defining as film-screen shot noise regions of the image in which the resultant value for energy imparted to the screen is infeasible.

Claim 99 (Previously Presented): A computer program storage medium according to claim 98, wherein regions of the image in which resultant values for energy imparted to the screen having negative values are defined as film-screen shot noise.

Claim 100 (Previously Presented): A computer program storage medium according to claim 98, wherein the image is a mammogram.

Claim 101 (Previously Presented): A method of calculating from a mammogram the compressed thickness of the imaged breast, comprising the step of delimiting in the mammogram the region corresponding to the part of the breast which is compressed from the region corresponding to the uncompressed breast edge by detecting the smoothness of curves of equal intensity in the mammogram.

Claim 102 (Previously Presented): A method according to claim 101, further comprising the steps of detecting the smooth equal intensity curve which is positioned furthest from the breast edge, calculating from the intensities along that curve the thickness of fat in the breast which gives those intensities, and calculating the thickness of the compressed breast from that thickness of fat.

Claim 103 (Previously Presented): A method according to claim 101, comprising as an initial step the conversion of the mammogram into the h_{int} representation representing the thicknesses of fat and interesting tissue in regions of the breast contributing to each point in the mammogram.

Claim 104 (Previously Presented): A method according to claim 103, wherein the conversion is performed on the basis of an underestimate of the compressed breast thickness, the conversion being iterated with successively changing estimates of the compressed breast thickness until a smooth delimitation between the region corresponding to the part of the breast which is compressed and the region corresponding to the uncompressed breast edge is found.

Claim 105 (Currently Amended): A method according to claim ~~any one of claims~~ 101, wherein a predefined smoothness threshold is set to detect the smooth curves.

Claim 106 (Currently Amended): A method of calculating the contribution to a mammogram of extra-focal radiation by calculating the compressed thickness of the imaged breast according to the method of claim 101 ~~35~~, calculating from the x-ray exposure and an estimate of the scattering of radiation the expected intensity in the mammogram along the delimitation between the region corresponding to the part of the breast which is compressed and the region corresponding to the uncompressed breast edge, and comparing the expected intensity to the actual intensity in the mammogram.

Claim 107 (Previously Presented): Apparatus for calculating from a mammogram the compressed thickness of the imaged breast, comprising means for delimiting in the mammogram the region corresponding to the part of the breast which is compressed from the region corresponding to the uncompressed breast edge by detecting the smoothness of curves of equal intensity in the mammogram.

Claim 108 (Previously Presented): Apparatus according to claim 107, further comprising detection means to detect the smooth equal intensity curve which is positioned furthest from the breast edge, and calculating means for calculating from the intensities along that curve the thickness of fat in the breast which gives those intensities, and for calculating the thickness of the compressed breast from that thickness of fat.

Claim 109 (Previously Presented): Apparatus according to claim 107, comprising conversion means for converting the mammogram into the h_{int} representation representing the thicknesses of fat and interesting tissue in regions of the breast contributing to each point in the mammogram.

Claim 110 (Previously Presented): Apparatus according to claim 109, wherein the conversion means first underestimates the compressed breast thickness, and iterates the conversion with successively changing estimates of the compressed breast thickness until a smooth delimitation between the region corresponding to the part of the breast which is compressed and the region corresponding to the uncompressed breast edge is found.

Claim 111 (Previously Presented): Apparatus according to claim 107, wherein a predefined smoothness threshold is set to detect the smooth curves.

Claim 112 (Previously Presented): Apparatus for calculating the contribution to a mammogram of extra-focal radiation comprising apparatus according to claim 107 for calculating the compressed thickness of the imaged breast, and further comprising expected intensity calculating means for calculating from the x-ray exposure and an estimate of the scattering of radiation the expected intensity in the mammogram along the delimitation between the region corresponding to the part of the breast which is compressed and the region corresponding to the uncompressed breast edge, and comparing means for comparing the expected intensity to the actual intensity in the mammogram.

Claim 113 (Previously Presented): A computer program storage medium readable by a computer system and encoding a computer program for controlling a computer to calculate from a mammogram the compressed thickness of the imaged breast by a method comprising the step of delimiting in the mammogram the region corresponding to the part of the breast which is compressed from the region corresponding to the uncompressed breast edge by detecting the smoothness of curves of equal intensity in the mammogram.

Claim 114 (Previously Presented): A computer program storage medium according to claim 113, wherein the method further comprises the steps of detecting the smooth equal intensity curve which is positioned furthest from the breast edge, calculating from the intensities

along that curve the thickness of fat in the breast which gives those intensities, and calculating the thickness of the compressed breast from that thickness of fat.

Claim 115 (Previously Presented): A computer program storage medium according to claim 113, wherein the method further comprises as an initial step the conversion of the mammogram into the h_{int} representation representing the thicknesses of fat and interesting tissue in regions of the breast contributing to each point in the mammogram.

Claim 116 (Previously Presented): A computer program storage medium according to claim 115, wherein the conversion is performed on the basis of an underestimate of the compressed breast thickness, the conversion being iterated with successively changing estimates of the compressed breast thickness until a smooth delimitation between the region corresponding to the part of the breast which is compressed and the region corresponding to the uncompressed breast edge is found.

Claim 117 (Previously Presented): A computer program storage medium according to claim 113, wherein a predefined smoothness threshold is set to detect the smooth curves.

Claim 118 (Previously Presented): A computer program storage medium readable by a computer system and encoding a computer program for controlling a computer to calculate the contribution to a mammogram of extra-focal radiation by calculating the compressed thickness of the imaged breast according to the method of claim 101, calculating from the x-ray exposure and an estimate of the scattering of radiation the expected intensity in the mammogram along the

delimitation between the region corresponding to the part of the breast which is compressed and the region corresponding to the uncompressed breast edge, and comparing the expected intensity to the actual intensity in the mammogram.

Claim 119 (Currently Amended): A method of processing a mammogram to produce an h_{int} representation representing the thicknesses of fat and interesting tissue in regions of the breast contributing to each point in the mammogram, the mammogram being produced by using an intensifying screen to receive x-rays transmitted through the breast and to emit light to be recorded as the mammogram on an x-ray film, the mammogram being digitised by a digitiser to obtain a digital representation thereof comprising pixel values representing the image intensities in the mammogram, the method comprising the steps of:

correcting the digital representation for degradation caused by the digitiser ~~according to the method of claim 67~~;

converting the values in the digital representation to values representing the energy which was imparted to the intensifying screen according to the method of claim 96 ~~10~~;

compensating the converted values for glare from the intensifying screen according to the method of claim 78;

further compensating the values for variations in intensity of the x-ray beam incident on the breast;

calculating the compressed thickness of the imaged breast according to the method of claim 101;

calculating the contribution to the mammogram of extra-focal radiation according to the method of claim 106;

subtracting from the compensated values the extra-focal radiation and an estimate of the scattered radiation to give enhanced measured values of the energy which was imparted to the intensifying screen; and

calculating the h_{int} representation by equating the enhanced measured values with predicted values.

Claim 120 (Previously Presented): A method according to claim 119, wherein the predicted values are calculated from the intensity of x-rays incident on the breast and the absorption characteristics of physical elements of the imaging system.

Claim 121 (Currently Amended): Apparatus for processing a mammogram to produce an h_{int} representation representing the thicknesses of fat and interesting tissue in regions of the breast contributing to each point in the mammogram, the mammogram being produced by using an intensifying screen to receive x-rays transmitted through the breast and to emit light to be recorded as the mammogram on an x-ray film, the mammogram being digitised by a digitiser to obtain a digital representation thereof comprising pixel values representing the image intensities in the mammogram, the apparatus comprising:

apparatus for correcting the digital representation for degradation caused by the digitiser ~~according to claim 70~~;

apparatus for calculating from the values in the digital representation values representing the energy which was imparted to the intensifying screen according to claim 79 ~~or 80~~;

apparatus for compensating the converted values for glare from the intensifying screen according to claim 89;

means for further compensating the values for variations in intensity of the x-ray beam incident on the breast;

apparatus for calculating the compressed thickness of the imaged breast according to claim 107;

apparatus for calculating the contribution to the mammogram of extra-focal radiation according to claim 112;

subtraction means for subtracting from the compensated values the extra-focal radiation and an estimate of the scattered radiation to give enhanced measured values of the energy which was imparted to the intensifying screen; and

h_{int} calculating means for calculating the h_{int} representation by equating the enhanced measured values with predicted values.

Claim 122 (Currently Amended): A computer program storage medium readable by a computer system and encoding a computer program for controlling a computer to process a mammogram to produce an h_{int} representation representing the thicknesses of fat and interesting tissue in regions of the breast contributing to each point in the mammogram, the mammogram being produced by using an intensifying screen to receive x-rays transmitted through the breast and to emit light to be recorded as the mammogram on an x-ray film, the mammogram being digitised by a digitiser to obtain a digital representation thereof comprising pixel values representing the image intensities in the mammogram, by a method comprising the steps of:

correcting the digital representation for degradation caused by the digitiser ~~according to the method of claim 67~~;

converting the values in the digital representation to values representing the energy which was imparted to the intensifying screen according to the method of claim 96 ~~10~~;

compensating the converted values for glare from the intensifying screen according to the method of claim 78;

further compensating the values for variations in intensity of the x-ray beam incident on the breast;

calculating the compressed thickness of the imaged breast according to the method of claim 101;

calculating the contribution to the mammogram of extra-focal radiation according to the method of claim 106;

subtracting from the compensated values the extra-focal radiation and an estimate of the scattered radiation to give enhanced measured values of the energy which was imparted to the intensifying screen; and

calculating the h_{int} representation by equating the enhanced measured values with predicted values.

Claim 123 (Previously Presented): A method of detecting microcalcifications in a breast from a mammogram of the breast, comprising the steps of processing the mammogram to produce an h_{int} representation according to the method of claim 119, converting the value of h_{int} for a candidate region into a value representative of the volume of interesting tissue and thresholding the volume values to detect as microcalcifications areas of the mammogram where the volume value exceeds a threshold.

Claim 124 (Previously Presented): A method according to claim 123 wherein the value of the volume of interesting tissue is compared to an estimate of the actual volume of the candidate region.

Claim 125 (Previously Presented): A method according to claim 123 wherein the volume values are calculated after subtraction from the h_{int} value of an estimate of the background h_{int}.

Claim 126 (Previously Presented): Apparatus for detecting microcalcifications in a breast from a mammogram of the breast, comprising apparatus for processing the mammogram to produce an h_{int} representation according to claim 121, means for converting the value of h_{int} for a candidate region into a value representative of the volume of interesting tissue and means for thresholding the volume values to detect as microcalcifications areas of the mammogram where the volume value exceeds a threshold.

Claim 127 (Previously Presented): Apparatus according to claim 126 further comprising means for comparing the value of the volume of interesting tissue to an estimate of the actual volume of the candidate region.

Claim 128 (Previously Presented): Apparatus according to claim 126 further comprising means for subtracting from the h_{int} value an estimate of the background h_{int}, before calculating the volume values.

Claim 129 (Previously Presented): A computer program storage medium readable by a computer system and encoding a computer program for controlling a computer to detect microcalcifications in a breast from a mammogram of the breast by a method comprising the steps of processing the mammogram to produce an h_{int} representation according to the method of claim 119, converting the value of h_{int} for a candidate region into a value representative of the volume of interesting tissue and thresholding the volume values to detect as microcalcifications areas of the mammogram where the volume value exceeds a threshold.

Claim 130 (Previously Presented): A computer program storage medium according to claim 129 wherein the value of the volume of interesting tissue is compared to an estimate of the actual volume of the candidate region.

Claim 131 (Previously Presented): A program storage medium according to claim 129 wherein the volume values are calculated after subtraction from the h_{int} value of an estimate of the background h_{int}.